

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Cancelled)

2. (Currently Amended): A control unit for electric power steering apparatus for applying a steering assist force to a steering system of a vehicle by a motor, comprising:
 an angle detecting device for detecting a rotation angle (θ) of the motor necessary for controlling the motor which is supplied a carrier wave signal ($\sin \omega t$) having a predetermined frequency and generates a sin signal ($\sin \omega t - \sin \theta$) having a wave shape obtained by modulating an amplitude of said carrier wave signal by $\sin \theta$ and a cos signal ($\sin \omega t - \cos \theta$) having a wave shape obtained by modulating the amplitude of said carrier wave signal by $\cos \theta$; and
 an abnormal region judging map constituted by two values including a value corresponding to said $\sin \theta$ and a value corresponding to said $\cos \theta$ and constituted by a normal region and an abnormal region;

~~The control unit for electric power steering apparatus as claimed in claim 1,~~ wherein said abnormal region judging map sets the value corresponding to said $\sin \theta$ to a value in an x-coordinate and sets the value corresponding to said $\cos \theta$ to a value in a Y-coordinate, and a region surrounded by a quadrangle α structured on a region constituted by an X-axis and a Y-axis orthogonal to each other around an origin in which both of the values in the X-coordinate and the Y-coordinate are zero, and a quadrangle β smaller than said quadrangle α constituted around said origin forms a normal region, [[.]] and

an abnormality of said angle detecting device is judged by mapping said $\sin \theta$ and said $\cos \theta$ respectively calculated from said sin signal and said cos signal to said abnormal region judging map.

3. (Currently Amended) The control unit for electric power steering apparatus as claimed in claim[[1 or]] 2, wherein the control ~~apparatus unit~~ detects said $\sin \theta$ and said $\cos \theta$ in synchronous with said carrier wave signal or at an integral multiple of cycle of the cycle of said carrier wave.

4. (Currently Amended): The control unit for electric power steering apparatus as claimed in ~~any one of claims 1 to 3~~ claim 2 or 3, wherein the control ~~apparatus unit~~ is provided with an angle detecting process circuit detecting an abnormality of said angle detecting device from said carrier wave signal, said $\sin \theta$ and said $\cos \theta$ and said abnormal region judging map, and doubly monitoring the abnormality of said angle detecting device by said angle detecting process circuit and said abnormal region judging map.

5. (Cancelled)

6. (Currently Amended): A control unit for electric power steering apparatus for applying a steering assist force to a steering system of a vehicle by a motor, comprising:
an angle detecting device for detecting a rotation angle (θ) of the motor necessary for controlling the motor which is supplied a carrier wave signal ($\sin \omega t$) having a predetermined frequency

and generates a sin signal ($\sin \omega t \cdot \sin \theta$) having a wave shape obtained by modulating an amplitude of said carrier wave signal by $\sin \theta$ and a cos signal ($\sin \omega t \cdot \cos \theta$) having a wave shape obtained by modulating the amplitude of said carrier wave signal by $\cos \theta$; and

an angle processing means respectively detecting the sin angle signal ($\sin \theta$) and the cos angle signal ($\cos \theta$) from said sin signal and said cos signal, and outputting a rotation angle signal formed by a signal formed by said cos angle signal and a signal formed by said sin angle signal;

The control unit for electric power steering apparatus as claimed in claim 5, wherein said motor is constituted by a three-phase brushless motor, the signal formed by said cos angle signal is constituted by a one-bit signal displaying positive or negative of the value of said cos angle signal, and the signal formed by said sin angle signal is constituted by two one-bit signals displaying respective results obtained by judging a size by two threshold values judging a level of the value of said sin angle signal[.], and

said motor is controlled on the basis of said rotation angle signal.

7. (Currently Amended): The control unit for electric power steering apparatus as claimed in claim [[5 or]] 6, wherein the control ~~apparatus unit~~ detects said sin angle signal and said cos angle signal from said sin signal and said cos signal respectively in

synchronous with said carrier wave signal or at an integral multiple of cycle of the cycle of said carrier wave.

8. (Currently Amended): The control unit for electric power steering apparatus as claimed in ~~any one of claims 5 to 7~~ claim 6 or 7, wherein the control ~~apparatus unit~~ is provided with an auxiliary angle processing means constituted by said angle processing means, and a main angle processing means for detecting said rotation angle θ , and controlling said motor on the basis of said rotation angle signal output by said auxiliary angle processing means in place of said rotation angle θ detected by said main angle processing means in the case that said main angle processing means is out of order.

9. (Original): The control unit for electric power steering apparatus as claimed in claim 8, wherein a current applied to said motor is constituted by a sine-wave current in the case of being controlled on the basis of said rotation angle θ , and a current applied to said motor is constituted by a rectangular current in the case of being controlled on the basis of said rotation angle signal.